

Lab 2 - Static NAT

Lab 2: NAT lab — Static NAT

The physical topology is as shown in Figure 14–2.

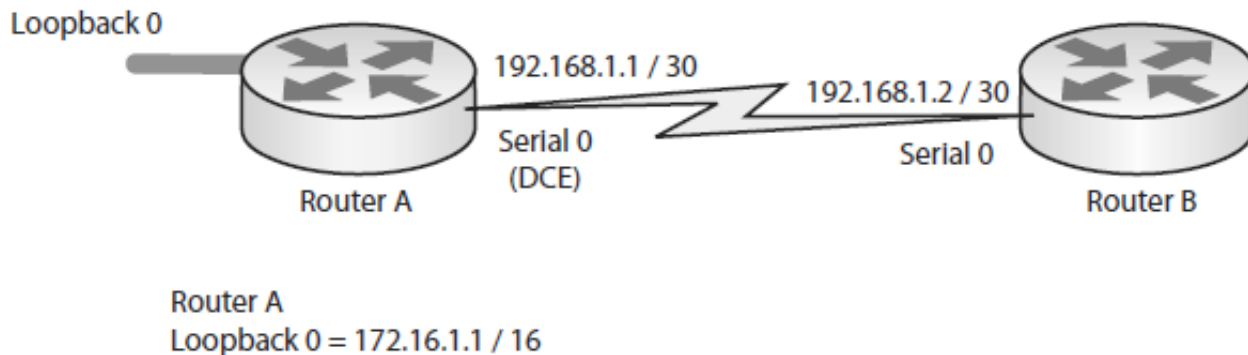


Figure 14–2: Static NAT

Lab exercise

Your task is to configure the network in Figure 14–2 to allow the 172.16.1.1 host on the 172.16.1.0 LAN to access the Internet'sing address 10.0.0.1. The 10.0.0.1 would normally be a routable public address provided by your ISP (such as 80.1.1.1), but for this lab, we will use a private non-routable address. Please feel free to try the lab without following the lab walk-through section and then just check the notes for the NAT config.

Purpose

Being able to configure NAT is a fundamental CCNA skill. Any client who needs to access the Internet will want to use NAT. The key is to understand the clients' requirements and then design a solution to fit their needs.

Lab objectives

1. Use the IP addressing scheme depicted in Figure 14–2. Router A needs a clock rate on interface serial 0: set this to 64000.
2. Set telnet access for the router to use the local login permissions of username "banbury" and the password "ccna" (not needed for NAT, but added for practice purposes).
3. Put a static route on the router.
4. Configure the inside and outside NAT interfaces on the router.
5. Configure a static NAT translation.
6. Test the NAT translation.

Lab walk-through

1. To set the IP addresses to an interface, you will need to do the following:

```
Router#config t
Router(config)#hostname RouterA
RouterA(config)#
RouterA(config)#interface serial 0
RouterA(config-if)#ip address 192.168.1.1 255.255.255.252
RouterA(config-if)#clock rate 64000 « If this is the DCE side
RouterA(config-if)#no shutdown
RouterA(config-if)#ip nat outside « The outside NAT network
RouterA(config-if)#interface loopback 0 « No need for “no shutdown”
on loopback interfaces
RouterA(config-if)#ip address 172.16.1.1 255.255.0.0
RouterA(config-if)#ip nat inside « The inside NAT network
RouterA(config-if)# ^Z
RouterA#
```

Router B:

```
Router#config t
Router(config)#hostname RouterB
RouterB(config)#interface serial 0
RouterB(config-if)#ip address 192.168.1.2 255.255.255.252
RouterB(config-if)#no shutdown
RouterB(config-if)#exit
RouterB(config)#ip route 0.0.0.0 0.0.0.0 s0 « Static route
RouterB(config)# ^Z
RouterB#
```

To set the clock rate on a serial interface (DCE connection only), you need to use the “clock rate #” command on the serial interface, where # indicates the speed:

```
RouterA(config-if)#clock rate 64000
```

Ping across the serial link now .

2. To set telnet access, you need to configure the VTY lines to allow telnet access: to do this type (from configuration mode):

```
RouterA(config)#line vty 0 4 « Enters the VTY line configuration
```

RouterA(config-line)#login local « **This will use local usernames**

and passwords for telnet access

RouterA(config-line)#exit « **Exit the VTY config mode**

RouterA(config)#username banbury password ccna « **Creates username**

and password for telnet access (login local)

Router B:

RouterB(config)#line vty 0 4

RouterB(config-line)#login local

RouterB(config-line)#exit

RouterB(config)#username banbury password ccna

3. To set the “enable password” do the following:

RouterA(config)#enable secret cisco « **Sets the “enable password” (encrypted)**

Router B:

RouterB(config)#enable secret cisco

4. Configure a static NAT translation:

RouterA(config)#ip nat inside source static 172.16.1.1 10.0.0.1

Static NAT translation

RouterA(config)# ^Z

5. To see if NAT is working, we need to turn on a debug with “debug ip nat” . Now imagine that the loopback address of 172.16.1.1 is a host on the LAN that wants to get out to the Internet. When the packet from the NATted LAN passes through the router, it will match the access-list and be statically translated to 10.0.0.1.

RouterA#debug ip nat « **Turn on the NAT debug**

RouterA#ping

Protocol [ip]:

Target IP address: 192.168.1.2 « **Ping router B**

Repeat count [5]:

Datagram size [100]:

Timeout in seconds [2]:

Extended commands [n]: y

Source address or interface: loopback 0 « **Source is the LAN**

Type of service [0]:

Set DF bit in IP header? [no]:

Validate reply data? [no]:

Data pattern [0xABCD]:

Loose, Strict, Record, Timestamp, Verbose[none]:

Sweep range of sizes [n]:

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 192.168.1.2, timeout is 2 seconds:

!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 40/40/40 ms

03:48:01: NAT: s=172.16.1.1->10.0.0.1, d=192.168.1.2 [35]

03:48:01: NAT*: s=192.168.1.2, d=10.0.0.1->172.16.1.1 [35]

03:48:01: NAT: s=172.16.1.1->10.0.0.1, d=192.168.1.2 [36]

03:48:01: NAT*: s=192.168.1.2, d=10.0.0.1->172.16.1.1 [36]

03:48:01: NAT: s=172.16.1.1->10.0.0.1, d=192.168.1.2 [37]

03:48:01: NAT*: s=192.168.1.2, d=10.0.0.1->172.16.1.1 [37]

03:48:01: NAT: s=172.16.1.1->10.0.0.1, d=192.168.1.2 [38]

03:48:01: NAT*: s=192.168.1.2, d=10.0.0.1->172.16.1.1 [38]

03:48:01: NAT: s=172.16.1.1->10.0.0.1, d=192.168.1.2 [39]

03:48:01: NAT*: s=192.168.1.2, d=10.0.0.1->172.16.1.1 [39]

You can see that the NAT debug shows the source (s=) as the loopback interface 172.16.1.1 which is translated to 10.0.0.1. The destination (d=) is the serial address for router B 192.168.1.2. The * shows the returning packet that is translated back.

The numbers in brackets [35, etc.] are the IP identification numbers of the packets.

RouterA#show ip nat translations

Pro	Inside global	Inside local	Outside local	Outside global
--	10.0.0.1	172.16.1.1	---	---

RouterA#

You can see from the NAT translation table above that the router is doing a one-to-one translation of the address.

6. Now please enter reload at the "Router#" prompt and type "yes" to confirm.

Show runs

```
RouterA#show run
Building configuration...
Current configuration : 757 bytes
!
version 12.1
no service single-slot-reload-enable
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname RouterA
!
ip subnet-zero
!
interface Loopback0
 ip address 172.16.1.1 255.255.0.0
 ip nat inside
!
interface Ethernet0
 no ip address
 shutdown
!
interface Ethernet1
 no ip address
 shutdown
!
interface Serial0
 ip address 192.168.1.1 255.255.255.252
 clock rate 64000
 ip nat outside
!
interface Serial1
 no ip address
 shutdown
!
```

```
ip nat inside source static 172.16.1.1 10.0.0.1
ip classless
no ip http server
!
line con 0
line aux 0
line vty 0 4
!
end
```

RouterA#

- - -

RouterB#show run

Building configuration...

Current configuration : 456 bytes

```
!
version 12.2
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname RouterB
!
ip subnet-zero
!
interface Serial0
 ip address 192.168.1.2 255.255.255.252
!
interface Serial1
 no ip address
 shutdown
!
ip classless
```

```
ip route 0.0.0.0 0.0.0.0 Serial0
no ip http server
ip pim bidir-enable
!
line con 0
line aux 0
line vty 0 4
!
end
```

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